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EXAMINER	
WILLIAMS, LAWRENCE B	
ART UNIT	**PAPER NUMBER**
2638	

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/080,262	KIM ET AL.	
	Examiner	Art Unit	
	Lawrence B. Williams	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because examiner suggests applicant replace the word "give" with "given" in line 5. Correction is required. See MPEP § 608.01(b).

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

3. Claim 10 is objected to because of the following informalities: Examiner suggests applicant replace the word "sequence" with "sequence" in line 3 of the claim.
Appropriate correction is required.

4. Claim 13 is objected to because of the following informalities: Examiner suggests applicant delete on set of the "of symbols" in line 5 of the claim.
Appropriate correction is required.

5. Claim 18 is objected to because of the following informalities: Examiner suggests applicant replace the word "stream" with "stream" in line 13 of the claim.
Appropriate correction is required.

6. Claim 20 is objected to because of the following informalities: Claim 20 is dependent upon claim 18, a method claim, yet recites limitations for apparatuses or devices. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claims cite either a method or apparatus for generating "quasi-complementary turbo codes, (QCTC)". A clear and concise definition of "quasi-complementary turbo codes, (QCTC)" is critical and essential to the practice of the invention, but is not included in the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Examiner suggest applicant incorporate the explanation given in one of his published works, ie. "Quasi-Complementary Turbo Code (QCTC) For Applications In High-Data-Rate Systems".

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

10. Claim 1 recites the limitation "the code select information" in line 20. There is insufficient antecedent basis for this limitation in the claim.

11. Claims 10-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 10 recites the limitation " a quasi-complementary turbo code decoder for multiplexing the independently interleaved parity symbol streams and the information symbol stream, **after decoding that according to a predetermined decode rate, outputting the information symbol stream**". Examiner is unable to determine the meaning of the portion of the claim cited in bold above. Accordingly, the claims 10-17 have not been further treated on the merits.

12. Claims 15-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 15 recites the limitation "and outputs to the channel de-interleaver". It is unclear as to what is output to the channel de-interleaver.

13. Claims 18-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 18 recites the limitation "(c) multiplexing the independently interleaved parity symbol streams and the information symbol stream, **after decoding that according to a predetermined decode rate, outputting the information symbol stream**". Examiner is unable

to determine the meaning of the portion of the claim cited in bold above. Accordingly, the claims 18-26 have not been further treated on the merits.

14. Claim 27 recites the limitation "the information symbol stream" and "the parity symbol streams" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Double Patenting

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/074,422. Although the conflicting claims are not identical, they are not patentably distinct from each other because both claims disclose an apparatus for generating (QCTC) quasi-complementary turbo codes. Both apparatuses comprise a turbo encoder with a plurality of constituent encoders for generating a stream/sequence of information symbols and a plurality of parity symbol streams/sequences according to a given code rate. Both claims disclose a channel interleaver for interleaving the stream/sequence of information symbols with the parity

stream/sequence. Both claims also disclose a QCTC selector/generator for repeating a stream obtained by serially combining/concatenating the information stream/sequence and the parity symbol stream/sequence.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

17. Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/680,815. Although the conflicting claims are not identical, they are not patentably distinct from each other because both claims disclose an apparatus for generating (QCTC) quasi-complementary turbo codes. Both apparatuses comprise a turbo encoder with a plurality of constituent encoders for generating a stream/sequence of information symbols and a plurality of parity symbol streams/sequences according to a given code rate. Both claims disclose a channel interleaver for interleaving the stream/sequence of information symbols with the parity stream/sequence. Both claims also disclose a QCTC selector/generator for repeating a stream obtained by serially combining/concatenating the information stream/sequence and the parity symbol stream/sequence.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

18. Claim 2 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 3 of copending Application No. 10/074,422. Although the conflicting claims are not identical, they are not patentably distinct

from each other because both claims disclose an apparatus for generating (QCTC) quasi-complementary turbo codes. Both apparatuses comprise a turbo encoder with a plurality of constituent encoders for generating a stream/sequence of information symbols and a plurality of parity symbol streams/sequences according to a given code rate. Both claims disclose a channel interleaver for interleaving the stream/sequence of information symbols with the parity stream/sequence; a multiplexer would be inherent to perform the multiplexing of the parity symbol streams generated in pairs disclosed in claim 2 of the instant application (new parity symbol sequence disclosed in claim 2 of co-pending application 10/074,422). Both claims also disclose a QCTC generator for generating a QCTC by repeating an output stream of the channel interleaver. Claim 2 of the instant application discloses a puncturing combined with the repeating for generating a QCTC, while claim 3 of co-pending application discloses an sub-code according to code rate and selection information. It is well known in the art that puncturing is used to adjust code rates, so its use would be inherent in the sub-code generation of claim 2 of co-pending application 10/074,422. The sub-code generation itself would be an inherent function of the device disclosed in claim 2 of the co-pending application since one skilled in the art could adjust the code rate, which would inherently adjust the generated QCTC.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

19. Claim 2 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 2 of copending Application No. 10/680,815. Claim 2 of copending Application No. 10/680,815 cites limitations similar to those

disclosed in claim 2 of copending Application No. 10/074,422. Therefore a similar rejection applies.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

20. Claim 3 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 2 of copending Application No. 10/074,422. Although the conflicting claims are not identical, they are not patentably distinct from each other because both claims disclose an apparatus for generating (QCTC) quasi-complementary turbo codes. Both apparatuses comprise a turbo encoder with a plurality of constituent encoders for generating a stream/sequence of information symbols and a plurality of parity symbol streams/sequences according to a given code rate. Both claims disclose a channel interleaver for interleaving the stream/sequence of information symbols with the parity stream/sequence. Both claims also disclose a QCTC selector/generator for repeating a stream obtained by serially combining/concatenating the information stream/sequence and the parity symbol stream/sequence. Claim 2 of co-pending application No. 10/074,422 both an information symbol interleaver and a plurality of interleavers for interleaving associated parity symbol streams (lines 3-5); a multiplexer for multiplexing the parity symbol streams in pairs (lines 6-8) and a serial combiner for serially combining an output of the information symbol interleaver with an output of the multiplexer (lines 9-11) as disclosed in claim 3 of the instant application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

21. Claim 3 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 2 of copending Application No. 10/680,815. Claim 2 of copending Application No. 10/680,815 cites limitations similar to those disclosed in claim 2 of copending Application No. 10/074,422. Therefore a similar rejection applies.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

22. Claim 8 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/074,422 and copending Application No. 10/680,815. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim1 of both co-pending applications disclose the apparatuses for generating both information and associated parity symbol streams/sequences, channel interleavers, and a QCTC generator. Claim 4 of the instant application merely discloses the method invoked by the apparatuses presented in the cited claims of both co-pending applications.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

23. Claim 9 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 8 of copending Application No. 10/074,422 and copending Application No. 10/680,815 in view of Tong et al. (US Patent 6,744,744 B1).

This is a provisional obviousness-type double patenting rejection.

Claim 9 inherits all limitations of claim 8 above. As noted above, copending Applications No(s). 10/074,422 and 10/680,815 disclose all limitations of claim 8 above. Claim 8 of the co-pending applications do not disclose wherein a puncturing pattern of symbols before interleaving has a uniform puncturing pattern.

However, Tong et al. discloses wherein a puncturing pattern of symbols before interleaving has a uniform puncturing pattern (col. 5, lines 20-25).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Tong et al. with the invention disclosed in claim 9 of co-pending Application No(s). 10/074,422 and 10/680,815 as a method of rate matching for data after channel interleaving.

24. Claims 6-7, 10-33 are provisionally rejected on the ground of nonstatutory double patenting over claims 1-3, 8-10 of copending Application No(s). 10/074,422 and 10/680,815. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1-3 and 8-10 of copending Application No(s). 10/074,422 and 10/680,815 disclose a QCTC (quasi-complementary turbo code) generating method and apparatus. It would have been obvious to one skilled in the art that a complementary QCTC (quasi-complementary turbo code) receiving method would be required. Claims 6-7, 10-33 of the instant application

merely cite a complementary receiving method and apparatus for the apparatus and method disclosed in the co-pending applications. Furthermore, there is no apparent reason why applicant would be prevented from presenting claims corresponding to those of the instant application in the other copending application. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

25. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

26. Claims 1-4, 8-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Tong et al. (US 6744744 B1).

(1) With regard to claim 1, Tong discloses in Fig. 5, a QCTC Quasi-Complementary Turbo Code) generating apparatus comprising: a turbo encoder having a plurality of constituent encoders, for generating an information symbol sequence and a plurality of parity symbol sequences by encoding the information symbol sequence, each constituent encoder for generating at least one parity symbol sequence corresponding to at least one parity symbol

sequence from another constituent encoder (element 90). Figure 5 of Tong discloses a plurality of constituent encoders (92), for generating an information symbol sequence S and a plurality of parity symbol sequences, P1 and P2, by encoding the information symbol sequence, each constituent encoder for generating at least one parity symbol sequence corresponding to at least one parity symbol sequence from another constituent encoder; a channel interleaver (Figure 5, element 93) for individually interleaving the information symbol sequence and the parity symbol sequences; and a QCTC selector (96) for repeating a stream obtained by serially combining (97) the stream of the information symbols and the streams of the parity symbols, and selecting at least one stream from the repeated streams according to the code select information.

(2) With regard to claim 2, claim 2 discloses limitations similar to those disclosed in claim 1. Therefore a similar rejection applies. (Fig. 5)

(3) With regard to claim 3, Tong et al. also discloses in Fig. 5, wherein the channel interleaver comprises: an information symbol interleaver (93, S) symbol streams for interleaving the information streams; a plurality of interleavers for interleaving the associated parity symbol (P1, P2); at least one multiplexer for multiplexing the parity symbol streams in pairs (95); and a serial combiner (97) for serially combining an output of the information symbol interleaver with an output of the multiplexer.

(4) With regard to claim 4, Tong et al. also discloses wherein a puncturing pattern of symbols before interleaving has a uniform puncturing pattern (col. 5, lines 20-25).

(5) With regard to claim 8, claim 8 discloses the method of the apparatus disclosed in claim 1, above. Therefore, a similar rejection applies.

(6) With regard to claim 9, Tong et al. also discloses wherein a puncturing pattern of symbols before interleaving has a uniform puncturing pattern (col. 5, lines 20-25).

Claim Rejections - 35 USC § 103

27. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

28. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tong et al. (US 6744744 B1) as applied to claim 2 above, and further in view of Markarian et al. (US Patent 6,611,940 B1).

Claim 5 inherits all limitations of claim 2 above. As noted Tong et al. discloses all limitations of clam 2 above. Tong et al. does not disclose wherein the turbo encoder comprises:
a turbo encoding block for generating a turbo code according to the code rate; and
a demultiplexer for demultiplexing an output of the turbo encoding block into information symbol streams and parity symbol streams.

However, Markarian et al. discloses in Fig. 1 wherein the turbo encoder comprises:
a turbo encoding block for generating a turbo code according to the code rate; and
a demultiplexer for demultiplexing an output of the turbo encoding block into information symbol streams and parity symbol streams (col. 2, lines 36-54)..

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Markarian et al. with the invention of Tong et al. as a method of achieving a desired data rate while improving the bit-error rate (col. 1, lines 50-51).

Conclusion

29. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a.) Sindhushayana et al. discloses in US 2003/0053435 A1 Enhanced Channel Interleaving For Optimized Data Throughput.

b.) Shamsunder et al. discloses in US 6,856,625 B1 Apparatus And Method of Interleaving Data To Reduce Error Rate.

c.) Kim et al. discloses in US 2005/0160347 A1 apparatus And Method For Generating Aand Decoding Forward Error Correction Codes Having Variable Rate In A High-Rate Wireless Data Communication System.

d.) Kim et al. discloses in US 2002/0144205 A1 Apparatus And Method For Generating Codes In Communications Systems.

Kim et al. discloses in US 2002/0152445 A1 Apparatus And Method For Generating Codes In Communications Systems.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 571-272-3037. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence B. Williams

lbw
November 21, 2005

EMMANUEL BAYARD
PRIMARY EXAMINER